EDE LAB
ANUAL NO-29

new

PRELIMINARY MANUAL for

KROHN-HITE

MODEL DCA-50 POWER AMPLIFIER
SERIAL No. 102

c/o PERRY THOMAS
RELIABILITY LAB

BULLETIN 110
APRIL, 1961

KROHN-HITE Corporation

50 WATT

WIDE-BAND DIRECT-COUPLED AMPLIFIER

Model DCA-50*

FREQUENCY RANGE: **DC to 500 KC**

FREQUENCY RESPONSE (DC to 500 KC): **±1 DB**

DISTORTION: **0.3%**

DYNAMIC RANGE: **85 DB**

MATCHING LOAD IMPEDANCE: **200 to 330 OHMS**

MAXIMUM OUTPUT VOLTAGE (RMS): **130 VOLTS**

MAXIMUM OUTPUT CURRENT (PEAK): **770 MA**

VOLTAGE GAIN: **20 DB**

The Model DCA-50 Wide-Band, Low-Distortion, Direct-Coupled Power Amplifier will deliver 50 volt-amperes (100 volt-ampere peaks) into a 330 ohm resistive or inductive load over the frequency range from dc to 250 kc (up to 50 kc into a capacitive load), and will deliver 100 watts continuously at dc. Over the frequency range from 1 cps to 500 kc, the amplifier will deliver 50 watts (100 watt peaks) into a 200 ohm resistive load.

The amplifier provides a choice of three voltage gains as determined by the setting of the input selector switch — fixed voltage gains of ten (20 db) with no phase reversal, one (zero db) with a phase reversal, or a continuously variable gain (between zero and ten) by means of the front panel gain control. For each gain setting, the input may be either direct coupled or capacitor coupled with a low cut-off frequency of 1 cps.

Since the Model DCA-50 has a phase reversal in the fixed unity gain position, it can convert a single-ended signal to a balanced signal. Two Model DCA-50 amplifiers can be cascaded to provide a balanced 100-watt output by operating the second amplifier at unity gain.

The amplifier output may be either direct coupled or capacitor coupled for applications requiring zero output dc level. The output dc level of the direct-coupled output may be zeroed by the front panel output dc level screwdriver control. When the capacitor-coupled output is used, the low cut-off frequency is approximately 30 cps with a 330 ohm resistive load.

The Model DCA-50 is basically a three-stage, direct-coupled amplifier. The first two stages are gain stages connected as balanced differential amplifiers for drift cancellation, and operated in push-pull to minimize distortion and provide a balanced output. Four series-parallel-connected power tubes are used in a unique power output stage that provides 50 watts conservatively over an extremely wide frequency range, with low distortion which is characteristic of push-pull operation.

The exceptional performance, frequency response, stability, and low distortion of this highly-linear amplifier is the result of quality components and the use of inverse feedback over an unusually wide frequency range. With this amplifier and a suitable oscillator, high distortion-free power is now available over the entire frequency range from sub-sonic through the audio and ultra-sonic range, and extending into the radio-frequency range. The Model DCA-50 is ideally suited for general purpose laboratory uses, computer systems, vibration analysis, seismological and geophysical studies, and medical and biological research.

*Patent Pending

Model DCA-50 POWER AMPLIFIER

specifications:

The following data applies only to the direct-coupled (DC) positions of the INPUT SELECTOR switch and direct-coupled (DC) OUTPUT terminals, unless otherwise specified.

POWER OUTPUT: 50 volt-amperes (100 volt-ampere peaks), continuous, from dc to 250 kc into a 330 ohm resistive or inductive load; up to 50 kc into capacitive load; 50 watts (100 watt peaks), continuous, from 1 cps to 500 kc into a 200 ohm resistive load. Permissible power output below 1 cps is limited with loads under 330 ohms because the output tube plates may overheat during instantaneous plate dissipation peaks.

OUTPUT VOLTAGE: Greater than 130 volts rms (370 volts peak to peak) open circuit from dc to 500 kc; 128 volts rms (365 volts peak to peak) across 330 ohms from dc to 250 kc; 100 volts rms (283 volts peak to peak) across 200 ohms from 1 cps to 500 kc.

OUTPUT CURRENT: Above 1 cps greater than 550 ma rms (± 770 ma peak) through 10 ohms; 500 ma rms (±700 ma peak) through 200 ohms; 392 ma rms (±550 ma peak) through 330 ohms. Below 1 cps 134 ma rms (±185 ma peak) through 10 ohms; 166 ma rms (±230 ma peak) through 200 ohms; 388 ma rms (±550 peak) through 330 ohms.

OUTPUT REGULATION (from no load to full resistive load): Less than 3% from 10 cps to 100 kc; less than 6% over the entire frequency range.

INTERNAL IMPEDANCE: Less than 6 ohms from 10 cps to 50 kc; 15 ohms from dc to 100 kc; 30 ohms above 100 kc.

LOAD IMPEDANCE: Matching, nominal 200 ohms from 1 cps to 500 kc; below 1 cps, 330 ohms for full power output. Minimum load, 10 ohms.

LOAD POWER FACTOR: Unity to zero, lagging or leading.

OUTPUT DC LEVEL: Zero volts at capacitor-coupled AC OUTPUT terminals; nominal zero volts at the DC OUTPUT terminals.

OUTPUT DC LEVEL STABILITY (typical, after initial warm-up, expressed in per cent of peak output voltage): ±0.02% in any one-hour period at fixed line voltage and ±0.1% for ±10% line voltage change in all positions of the INPUT SELECTOR switch except the X10 DC and POT DC positions where ±0.2% and ±0.5% respectively apply.

VOLTAGE GAIN: Maximum of 10, variable continuously, fixed gain of 10±10% (20±1 db), or fixed gain of 1±10% (0±1 db) as determined by the INPUT SELECTOR switch. Less than ±0.1 db change in gain for a 10% change in line voltage within the operating range.

FREQUENCY RESPONSE: Flat within ±1 db from dc to 500 kc under all specified operating conditions; approximately 3 db down at 800 kc.

PHASE SHIFT (matched load): Zero ±1 degree from dc to 10 kc in the X10 and POT positions of the INPUT SELECTOR switch. In the X1 position, 180 ±1 degrees.

HARMONIC DISTORTION (rms): At full power output, less than 0.3% from 2 cps to 10 kc, less than 0.5% from near dc to 100 kc, and less than 4% above 100 kc. DC linearity within ±2% with loads above 200 ohms.

HUM AND NOISE (referred to output): Less than 5 mv with the input shorted and less than 30 mv with an open circuit input.

DYNAMIC RANGE: Approximately 85 db.

INPUT IMPEDANCE: Greater than 1 megohm in parallel with approximately 50 $\mu\mu$f in the fixed gain positions; 5,000 ohms in parallel with approximately 50 $\mu\mu$f in the variable gain positions.

INPUT COUPLING: Either direct coupling or capacitor coupling with a low cut-off frequency of 1 cps.

INPUT SENSITIVITY: 10 volts rms with a 200 ohm load and 13 volts rms with a 330 ohm load for 50 watts output at maximum gain (X10).

INPUT VOLTAGE LIMITS: 400 volt maximum dc component in the capacitor-coupled (1 CPS) fixed gain positions; combined input signal voltages (ac and dc) must not cause more than 2 watts dissipation in the 5,000 ohm GAIN potentiometer in either variable gain position.

AMBIENT TEMPERATURE AND DUTY CYCLE: Continuous duty at full 50 watt output up to 50°C (122°F) ambient.

FRONT PANEL CONTROLS:
INPUT SELECTOR switch.
GAIN control.
OUTPUT DC LEVEL control (screwdriver adjust).
QUIESCENT CURRENT control (screwdriver adjust).
POWER ON switch.

TERMINALS: Front panel, two multi-purpose binding posts for the INPUT (signal and ground) and three for the OUTPUT (DC signal, AC signal, and ground). Rear of chassis, three BNC coaxial connectors — one for the input, one for the dc output, and one for the ac output.

POWER REQUIREMENTS:
105-125 or 210-250 volts; single phase; 50-60 cycles; 600 watts.

FUSE PROTECTION:
Line: 6¼ Ampere SLOW-blow
Plate Supply: ¾ Ampere SLOW-blow

TUBE COMPLEMENT (furnished with instrument): Four 6DQ5, four 6AS7-GA, two 6CL6, one each: 6AQ5, 12AX7, 5R4-GYA, 6AU5, 6BK7A.

MECHANICAL SPECIFICATIONS: Housed in an attractively styled, louvered steel cabinet, with a cast aluminum front panel and frame. Front panel finished in gray enamel; frame and cabinet in blue enamel. Other finishes available on special order. Model DCA-50 over-all dimensions: 17¼" wide, 9" high, 16" deep. Shipping weight: 112 lbs. (Net weight: 85 lbs.) Also available with standard relay rack panel, designated as Model DCA-50R. Model DCA-50R over-all dimensions: 19" wide, 8¾" high, 16" deep. Weight same as Model DCA-50

Condensed Ordering Specifications:

Model DCA-50 Wide-Band Direct-Coupled Amplifier
Power Output: 50 watts continuous from dc to 500 kc.
Distortion: Less than 0.3% from 2 cps to 10 kc
Voltage Gain: Maximum of 10 (20 db)
Input Impedance: 1 megohm or 5,000 ohms
Output Hum and Noise: Less than 5 millivolts (input shorted)
Load Impedance: Nominal 200 ohms. Below 1 cps, 330 ohms
Input Power: 115/230 volts; 50-60 cycles; 600 watts

PRICE: $685, F.O.B. plant, Cambridge, Mass. Terms: net 30 days.
Specifications and prices are subject to change without notice.

KROHN-HITE CORPORATION
580 Massachusetts Avenue • Cambridge 39, Mass.
UNiversity 4-4272
Pioneering in Quality Electronic Instruments

17M Printed in U.S.A. 4/61

PRELIMINARY MANUAL

MODEL DCA-50

FINAL OPERATING AND MAINTENANCE MANUAL
WILL BE FORWARDED WHEN PRINTED

KROHN-HITE CORPORATION
580 Massachusetts Avenue, Cambridge 39, Mass., U.S.A.

SECTION I - GENERAL DESCRIPTION

1. TECHNICAL SUMMARY

The following data applies only to the direct-coupled (DC) positions of the INPUT SELECTOR switch and direct-coupled (DC) output terminals, unless otherwise specified.

POWER OUTPUT: 50 volt-amperes (100 volt-ampere peaks), continuous, from dc to 250 kc into a 330 ohm resistive or inductive load; up to 50 kc into capacitive load; 50 watts (100 watt peaks), continuous, from 1 cps to 500 kc into a 200 ohm resistive load. Permissible power output below 1 cps is limited with loads under 330 ohms because the output tube plates may overheat during instantaneous plate dissipation peaks.

OUTPUT VOLTAGE: Greater than 130 volts rms (370 volts peak to peak) open circuit from dc to 500 kc; 128 volts rms (365 volts peak to peak) across 330 ohms from dc to 250 kc; 100 volts rms (283 volts peak to peak) across 200 ohms from 1 cps to 500 kc.

OUTPUT CURRENT: Above 1 cps greater than 550 ma rms (±770 ma peak) through 10 ohms; 500 ma rms (±700 ma peak) through 200 ohms; 392 ma rms (±550 ma peak) through 330 ohms. Below 1 cps 134 ma rms (±185 ma peak) through 10 ohms; 166 ma rms (±230 ma peak) through 200 ohms; 388 ma rms (±550 peak) through 330 ohms.

OUTPUT REGULATION (from no load to full resistive load): Less than 3% from 10 cps to 100 kc; less than 6% over the entire frequency range.

INTERNAL IMPEDANCE: Less than6 ohms from 10 cps to 50 kc; 15 ohms from dc to 100 kc and less than 30 ohms above 100 kc.

LOAD IMPEDANCE: Matching, nominal 200 ohms from 1 cps to 500 kc; below 1 cps, 330 ohms for full power output. Minimum load, 10 ohms.

LOAD POWER FACTOR: Unity to zero, lagging or leading.

OUTPUT DC LEVEL: Zero volts at capacitor-coupled AC OUTPUT terminals; nominal zero volts at the DC OUTPUT terminals.

OUTPUT DC LEVEL STABILITY (typical, after initial warm-up, expressed in per cent of peak output voltage): ±0.02% in any one-hour period at fixed line voltage and ±0.1% for ±10% line voltage change in all positions of the INPUT SELECTOR switch except the X10 DC and POT DC positions where ±0.2% and ±0.5% respectively apply.

VOLTAGE GAIN: Maximum of 10, variable continuously, fixed gain of 10 ±10% (20±1 db), or fixed gain of 1±10% (0±1 db) as determined by the INPUT SELECTOR switch. Less than ±0.1 db change in gain for a 10% change in line voltage within the operating range.

FREQUENCY RESPONSE: Flat within ±1 db from dc to 500 kc under all specified operating conditions; approximately 3db down at 800 kc.

PHASE SHIFT (matched load): Zero ±1 degree from dc to 10 kc in the X10 and POT positions of the INPUT SELECTOR switch. In the X1 position, 180±1 degrees.

HARMONIC DISTORTION (rms): At full power output, less than 0.3% from 2 cps to 10 kc, less than 0.5% from near dc to 100 kc, and less than 4% above 100 kc. DC linearity within ±2% with loads above 200 ohms.

HUM AND NOISE (referred to output): Less than 5 mv with the input shorted and less than 30 mv with an open circuit input.

DYNAMIC RANGE: Approximately 85 db.

INPUT IMPEDANCE: Greater than 1 megohm in parallel with approximately 50 μμf in the fixed gain positions; 5,000 ohms in parallel with approximately 50 μμf in the variable gain positions.

INPUT COUPLING: Either direct coupling or capacitor coupling with a low cut-off frequency of 1 cps.

INPUT SENSITIVITY: 10 volts rms with a 200 ohm load and 13 volts rms with a 330 ohm load for 50 watts output at maximum gain (X10).

INPUT VOLTAGE LIMITS: 400 volt maximum dc component in the capacitor-coupled (1 CPS) fixed gain positions; combined input signal voltages (ac and dc) must not cause more than 2 watts dissipation in the 5,000 ohm GAIN potentiometer in either variable gain position.

AMBIENT TEMPERATURE and DUTY CYCLE: Continuous duty at full 50 watt output up to 50°C (122°F) ambinent.

FRONT PANEL CONTROLS:

INPUT SELECTOR switch.
GAIN control.
OUTPUT DC LEVEL control (screwdriver adjust).
QUIESCENT CURRENT control (screwdriver adjust).
POWER ON switch.

TERMINALS: Two multi-purpose binding posts for the INPUT (signal and ground) and three for the OUTPUT (DC signal, AC signal, and ground). The Model DCA-50 also has three type BNC coaxial connectors on the rear of the chassis - one for the input, one for the dc output, and one for the ac output.

POWER REQUIREMENTS:

105-125 or 210-250 volts; single phase; 50-60 cycles; 600 watts.

FUSE PROTECTION:

Line: 6 1/4 Ampere SLOW-blow.
Plate Supply: 3/4 Ampere SLOW-blow.

TUBE COMPLEMENT (furnished with instrument): Four 6 DQ5, four 6AS7-GA, two 6CL6, on each: 6AQ5, 12AX7, 5R4-GYA, 6AU5, 6BK7A.

MECHANICAL SPECIFICATIONS:

Housed in an attractively styled, louvered steel cabinet, with a cast aluminum front panel and frame. Front panel finished in gray enamel; frame and cabinet in blue enamel. Other finishes available on special order. Model DCA-50 overall dimensions: 17 1/4" wide, 9" high, 16" deep. Shipping weight: 112 lbs. (Net weight: 85 lbs.) Also available with standard relay rack panel, designated as Model DCA-50R. Model DCA-50R overall dimensions: 19" wide, 8 3/4" high, 16" deep. Weight same as Model DCA-50.

2. DESCRIPTION

The Model DCA-50* is a wide-band, low-distortion, direct-coupled power amplifier. It will deliver 50 volt-amperes (100 volt-ampere peaks) into a 330 ohm resistive or inductive load over the frequency range from dc to 250 kc (up to 50 kc into capacitive load) and will deliver 100 watts continuously at dc. Over the frequency range from 1 cps to 500 kc the Amplifier will deliver 50 watts (100 watt peaks) into a 200 ohm resistive load.

The Amplifier provides a choice of three voltage gains as determined by the setting of the INPUT SELECTOR switch; fixed voltage gains of ten (20 db) with no phase reversal or one (0 db) with a phase reversal, or a continuously variable gain (between zero and ten) with no phase reversal by means of the front panel GAIN control. For each gain setting the input may be either direct coupled or capacitor coupled with a low cut-off frequency of 1 cps.

Since the Model DCA-50 has a phase reversal in the fixed unity gain position, it can convert a single-ended signal to a balanced signal. Two Model DCA-50 Amplifiers can be cascaded to provide a balanced 100 watt output by operating the second Amplifier at unity gain.

The Amplifier output may be either direct coupled (DC) or capacitor coupled (AC) for applications requiring zero output dc level. When the AC output is used, the low cut-off frequency is approximately 25 cps with a 330 ohm resistive load. The output dc level of the direct-coupled (DC) output may be zeroed by the front panel OUTPUT DC LEVEL screwdriver control.

The Model DCA-50 is basically a three-stage, direct coupled amplifier. The first two stages are gain stages connected as balanced differential amplifiers for drift cancellation and operated in push-pull to minimize distortion and provide a balanced output. Four series-parallel connected power tubes are used in the power output stage in a unique circuit which provides 50 watts conservatively over an extremely wide frequency range with low distortion which is characteristic of push-pull operation.

When the Amplifier is operated at the maximum gain of ten (20 db) the input is applied to one grid of the first balanced stage and the voltage feedback is applied to the opposite grid. This provides gain with no phase reversal which is typical of voltage feedback amplifiers. To obtain unity gain with a phase reversal, one grid of the first balanced stage is grounded and the junction of an input-output summing network is applied to the opposite grid as in operational feedback amplifiers.

The exceptional performance, frequency response, stability and low distortion of this highly-linear Amplifier is the result of quality components, good construction, careful engineering and the use of inverse feedback over an unusually wide frequency range. With this Amplifier and a suitable oscillator, high distortion-free power is now available over the entire frequency range from subsonic through the audio and ultrasonic range and extending into the radio-frequency range. The Model DCA-50 is ideally

*Patent Pending

suited for general purpose laboratory uses, computer systems, vibration analysis, seismological and geophysical studies and medical and biological research.

SECTION II - OPERATION

The Model DCA-50 Power Amplifier is adjusted and checked carefully in Final Test to insure that it meets all specifications. It is then aged and again tested prior to shipment to be sure that it is ready for use. The Amplifier is shipped complete and after unpacking is ready to be turned on and used. When rack mounting the Model DCA-50R, it may be necessary to remove the four rubber bumpers mounted on the bottom dust cover. The recommended operating procedure is described below.

1. CONTROLS

a. POWER - The power off-on toggle switch is marked POWER. In the ON position the Amplifier is completely energized and, after less than one minute warm up, may be used. However, a longer time is required to stabilize the output dc level.

b. INPUT SELECTOR - The INPUT SELECTOR switch permits a choice of six different operating conditions in the switch positions marked DC X10, 1 CPS X10, DC X1, 1 CPS X1, DC POT and 1 CPS POT.

In the X10 positions, there is a fixed gain of ten with no phase reversal and the input impedance is approximately one megohm.

In the X1 positions, there is a fixed gain of unity with a phase reversal and the input impedance is also approximately one megohm. These X1 positions provide reduced distortion at frequencies below 500 cps, in addition to a more stable output dc level. The phase reversal enables the Amplifier to convert any single-ended signal into a push-pull balanced signal. Two Model DCA-50 Amplifiers with the OUTPUT of one connected to the INPUT of the other (operating at a X1 position) will provide a combined push-pull output of 100 watts.

In the POT positions there is no phase reversal, the gain is variable up to a maximum of ten as determined by the setting of the GAIN control and the input impedance is approximately 5,000 ohms.

CAUTION

The combined dc plus ac input signals should not dissipate over 2 watts in the 5,000 ohm GAIN control which is connected directly across the INPUT terminals in both POT positions.

In the 1 CPS X10 and 1 CPS X1 positions, the dc component of the input voltage may be as high as 400 volts.

In the three 1 CPS positions, the gain falls off below 1 cps and the output dc level is more stable than in the three DC positions.

c. GAIN - To use the GAIN control, the INPUT SELECTOR switch should be in either of the two positions marked POT. The total gain of the Amplifier is adjustable up to a maximum of ten.

2. LOAD IMPEDANCE

Although the Amplifier may be used with any load of ten ohms or more, the rated 50 watt (or volt-ampere) output is obtained reliably from 1 cps to 250 kc with any resistive load from 200 to 330 ohms. Below 1 cps a 330 ohm resistive load should be used and above 250 kc a 200 ohm resistive load is recommended. When low-resistance loads are used on the DC OUTPUT, the output dc level should be maintained close to zero.

Output power in excess of rating, limited only by the clipping level, may be obtained without damaging the Amplifier, except at frequencies below 1 cps when the load is less than 330 ohms.

For reactive loads, the impedance level is 330 ohms for full 50 volt-ampere output.

Since 50 watts of average sine-wave power corresponds to 100 watt peaks, the Amplifier will provide 100 watts of dc power continuously into a 330 ohm load with a maximum output swing of ±182 volts.

3. LINE VOLTAGE

The Amplifier, as normally shipped, is connected for operation from an ac power source of 105 to 125 volts, 50 to 60 cycles, and uses a 6 1/4 ampere slow-blow line fuse. The Amplifier may be modified for operation from an ac power source of 210 to 250 volts, 50 to 60 cycles, by removing the two jumpers on the four (4) terminal strip, located on the inside of the chassis directly below the line cord, and adding a jumper between the two center terminals. A 3 2/10 slow-blow line fuse should be used for 210-250 volt operation.

A line voltage switch is located on the rear of the chassis. For a line voltage between 105 and 114, this switch should be in the LOW position. For a line voltage between 114 and 125, this switch should be in the HIGH position.

4. TERMINALS

a. INPUT - Two combination-type binding posts are provided on the front panel with the black post grounded. In addition, there is a type BNC input connector on the rear of the chassis.

b. OUTPUT - Three combination-type binding posts are provided on the front panel, one for direct coupling (DC) and one for capacitor coupling (AC) with the middle terminal (GND) grounded. In addition, there are two type BNC output connectors on the rear of the chassis for the direct coupled (DC) and the capacitor coupled (AC) output.

The DC OUTPUT may be used at any frequency. The AC OUTPUT is capacitor coupled to insure zero output dc level and when it is used, the low cut-off frequency varies with the resistance of the load: approximately 40 cps with a 200 ohm load, 25 cps with a 330 ohm load, 1/4 cps with a 100 K load and 1/5 cps with no load.

If long leads are used between the OUTPUT and the load at high frequencies, the capacitive load of the leads must be considered. At 500 kc a shunt capacitance of 200 uuf will reduce the useful power output of the Amplifier approximately 5%.

Reasonable care should be exercised to prevent oscillation caused by stray capacitive coupling of the OUTPUT signal of the Amplifier to the INPUT leads or terminals.

5. TEST JACK VOLTAGE AND OUTPUT DC LEVEL

Adjustments have been made at the Factory for zero output dc level and the correct output-stage quiescent current. The screwdriver controls and corresponding test jacks for the output dc level and quiescent current are on the front panel. With shorted INPUT and the INPUT SELECTOR on DC X10, adjust the OUTPUT DC LEVEL control until the output dc level (as measured across the OUTPUT DC LEVEL test jacks) is zero. This is especially important when using low resistance loads on the DC OUTPUT.

The correct output-stage quiescent current is indicated by a dc reading of minus one volt as measured across the QUIESCENT CURRENT test jacks. Adjust the QUIESCENT CURRENT control until the correct voltage is obtained.

After the Amplifier has had sufficient time to warm up and before extensive use it is recommended that these readings be checked and the controls readjusted if necessary.

6. FUSES AND INDICATORS

The 6 1/4 Ampere SLOW-blow fuse (used with 105-125 volts line) is mounted on the front panel and is in series with the ac input power. When this fuse is open, the associated blown FUSE INDICATOR will light. A 3 2/10 slow-blow line fuse should be used for 210-250 volt operation.

The 3/4 Ampere SLOW-blow fuse, also on the front panel, is in the ground circuit of the regulated power supplies. When this fuse is open, the associated blown FUSE INDICATOR will light, except under some unusual conditions of input signal and output load.

Voltage readings taken with 120V line, line switch in the 114-125 volt position, DC output set for 0 volts, quiescent set for -1 volt, input selector in DC X10 position and input shorted.

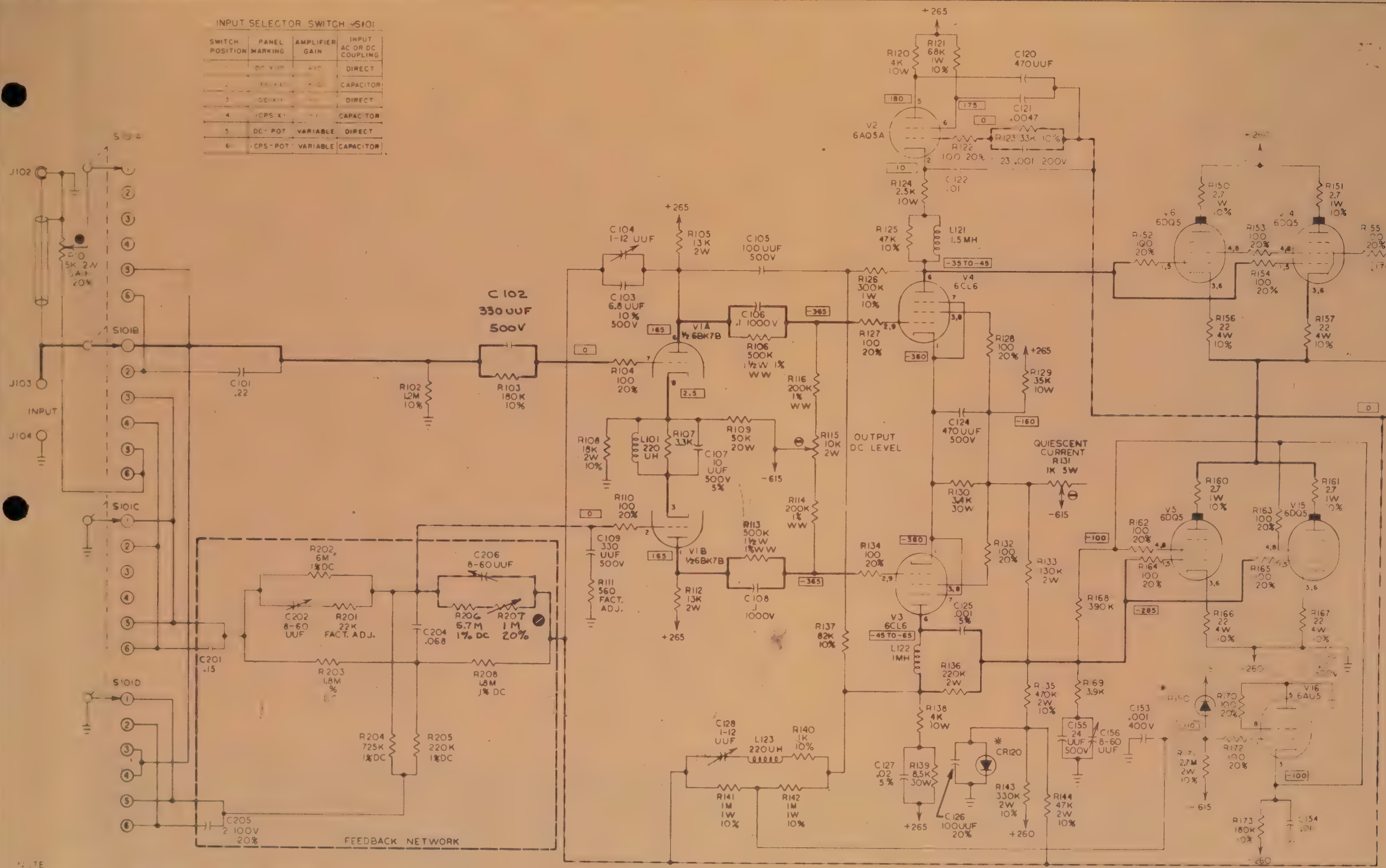
Resistance readings taken with HB6's shorted, input selector in the DC X10 position and input shorted.

TUBE NO.		PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9	PLATE CAP
V1	V	165	0±1	2.5	-100	-100	165	0	2.5	0	--
6BK7B	R	25K	600K	15K	150K	150K	25K	180K	15K	0	--
V2	V	0±1	10	0±1	0±1	180	175	0±1			
6AQ5A	R	80K	440K	210K	210K	18K	85K	80K			
V3	V	-360	-365	-160	-350	-350	-45 to -65	-360	-160	-365	
6CL6	R	25K	170K	50K	270K	270K	25K	25K	50K	170K	
V4	V	-360	-365	-160	-350	-350	-35 to -45	-360	-160	-365	
6CL6	R	25K	170K	50K	270K	270K	440K	25K	50K	170K	
V5	V	-285	-350	-260	-100	-285	-260	-350	-100		0±1
6DQ5	R	70K	270K	6K	140K	70K	6K	270K	140K		48K
V6	V	-42	0±1	1.5	170	-42	1.5	0±1	170		260
6DQ5	R	430K	210K	48K	50K	430K	48K	210K	50K		6K
V7	V	--	320	--	-620	--	-620	320	320		
5R4	R	--	14K	--	20K	--	20K	14K	14K		
V8	V	195	370	265	195	370	265	5	5		
6AS7	R	500K	22K	6K	500K	22K	6K	100	100		
V9	V	-55	-250	-260	-100	-100	190	-2	0	-100	
12AX7A	R	480K	140K	6K	150K	150K	500K	160K	0	150K	
V10	V	195	370	265	195	370	265	5	5		
6AS7	R	500K	22K	6K	500K	22K	6K	100	100		
V11	V	-55	120	3	-55	120	5	5	5		
6AS7	R	500K	30K	100	500K	30K	100	100	100		
V12	V	-55	120	3	-55	120	5	5	5		
6AS7	R	500K	30K	100	500K	30K	100	100	100		
V13	V	0	5	5	5	--	0±1	160	--		
6X4	R	48K	100	100	100	--	46K	53K	--		
V14	V	-42	0±1	1.5	170	-42	1.5	0±1	170		
6DQ5	R	430K	210K	48K	50K	430K	48K	210K	50K		
V15	V	-285	-350	-260	-100	-285	-260	-350	-100		
6DQ5	R	70K	270K	6K	140K	70K	6K	270K	140K		
V16	V	-110	-100	-100	--	0	-55	-100	0		
6AU5	R	3K	140K	140K	--	0	480K	140K	100		

Model DCA-50 Table of Voltage and Resistance Measurements

INPUT SELECTOR SWITCH S101

SWITCH POSITION	PANEL MARKING	AMPLIFIER GAIN	INPUT AC OR DC COUPLING
1	DC X1	+1	DIRECT
2	CPS X1	+1	CAPACITOR
3	DC X1	-1	DIRECT
4	CPS X1	-1	CAPACITOR
5	DC - POT	VARIABLE	DIRECT
6	CPS - POT	VARIABLE	CAPACITOR



NOTE

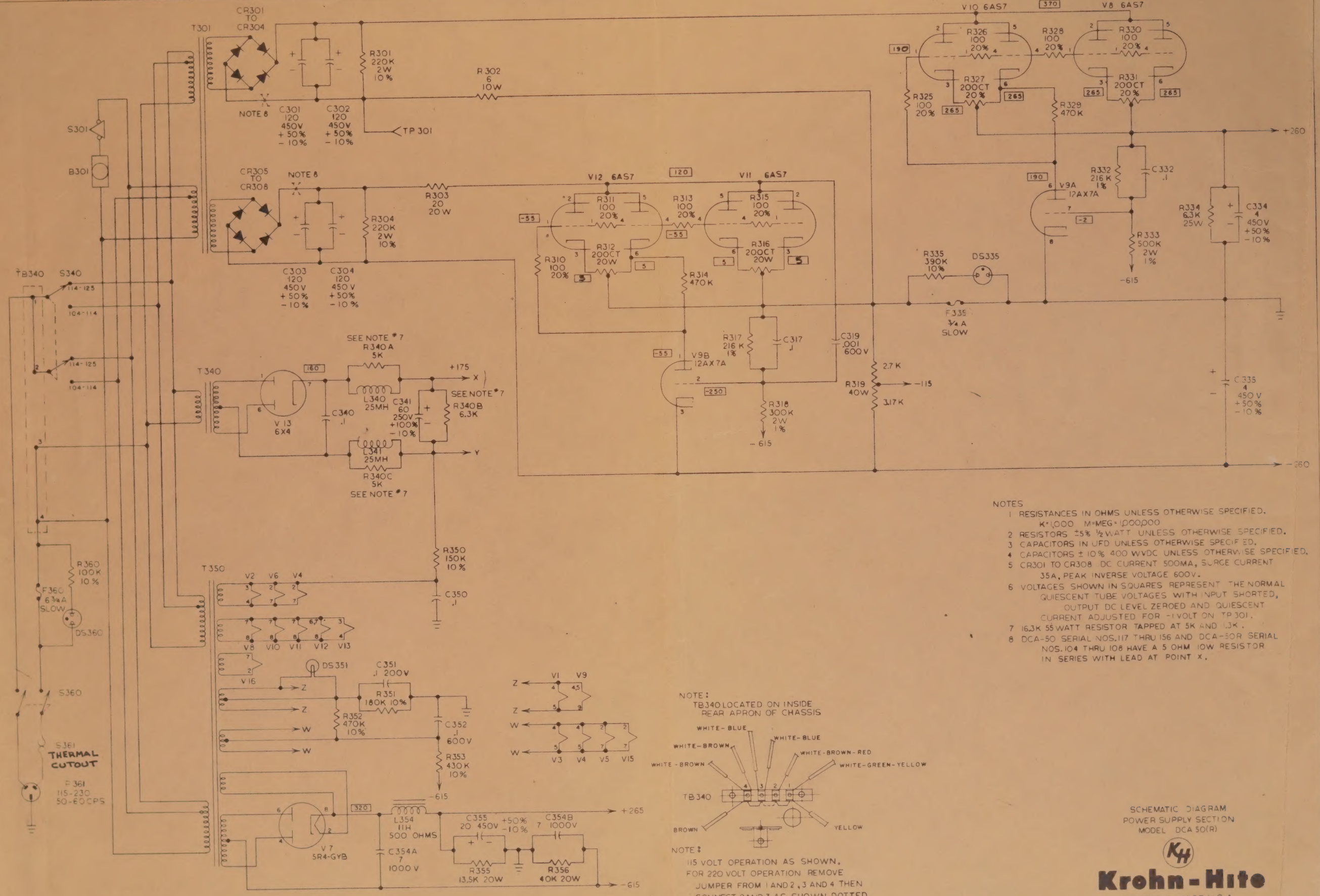
1. RESISTANCES IN OHMS UNLESS OTHERWISE SPECIFIED. K = 1,000 M = MEG = 1,000,000
2. RESISTORS ± 5% ½ WATT UNLESS OTHERWISE SPECIFIED.
3. CAPACITOR IN UFD UNLESS OTHERWISE SPECIFIED.
4. CAPACITOR ± 10% 400WVDC UNLESS OTHERWISE SPECIFIED
5. R 2C AND R150 SPECIFICATION
   PIV > 200V
   RB > 2MEG
   RF < 200
5. VOLTAGES SHOWN IN SQUARES REPRESENT THE NORMAL QUIESCENT TUBE VOLTAGES WITH INPUT SHORTED AND OUTPUT DC LEVEL ZEROED AND QUIESCENT CURRENT ADJUSTED FOR -1 VOLT ON TP101
6. ALL VOLTAGES 20%
7. R150, R151, R160 AND R161 MOLDED IN PLATE LEAD.
8. DC = DEPOSITED CARBON.
9. WW = WIRE WOUND.

● KNOB CONTROL
⊘ EXTERNAL SCREWDRIVER ADJUST
⊘ INTERNAL SCREWDRIVER ADJUST
– – – – FEEDBACK SIGNAL PATH
——— FORWARD SIGNAL PATH

SCHEMATIC DIAGRAM
WIDE-BAND 50WATT AMPLIFIER
MODEL DCA 50(R)

Krohn-Hite
CAMBRIDGE, MASS. U.S.A.

5/15/61



NOTES

1. RESISTANCES IN OHMS UNLESS OTHERWISE SPECIFIED. K=1,000 M=MEG=1,000,000
2. RESISTORS ±5% ½ WATT UNLESS OTHERWISE SPECIFIED.
3. CAPACITORS IN UFD UNLESS OTHERWISE SPECIFIED.
4. CAPACITORS ± 10% 400 WVDC UNLESS OTHERWISE SPECIFIED.
5. CR301 TO CR308 DC CURRENT 500MA, SURGE CURRENT 35A, PEAK INVERSE VOLTAGE 600V.
6. VOLTAGES SHOWN IN SQUARES REPRESENT THE NORMAL QUIESCENT TUBE VOLTAGES WITH INPUT SHORTED, OUTPUT DC LEVEL ZEROED AND QUIESCENT CURRENT ADJUSTED FOR -1 VOLT ON TP 301.
7. 16.3K 55 WATT RESISTOR TAPPED AT 5K AND 10.3K.
8. DCA-50 SERIAL NOS. 117 THRU 156 AND DCA-50R SERIAL NOS. 104 THRU 108 HAVE A 5 OHM 10W RESISTOR IN SERIES WITH LEAD AT POINT X.

NOTE:
TB340 LOCATED ON INSIDE REAR APRON OF CHASSIS

NOTE:
115 VOLT OPERATION AS SHOWN. FOR 220 VOLT OPERATION REMOVE JUMPER FROM 1 AND 2, 3 AND 4 THEN CONNECT 2 AND 3 AS SHOWN DOTTED.

SCHEMATIC DIAGRAM
POWER SUPPLY SECTION
MODEL DCA 50(R)

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